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# EVALUATION OF WILDLIFE DAMAGE TO FORESTS IN GERMANY

MARKUS J. SCHALLER

**Abstract:** Legal regulations concerning wildlife damage in Germany are totally different from regulations in the United States. In certain cases German game laws provide the right to compensation for wildlife damage to forests for forest owners. But not everyone has to be compensated. Liability exists only for damage caused by hooved game, rabbits, and pheasants, and only to important local tree species (Hauptholzarten). If, for example, red deer damage an afforestation of Norway spruce (*Picea abies*) by browsing, normally the shooting tenant has to compensate for the damage. The most important types of damage to forests in Germany are browsing and debarking by red deer (*Cervus elaphus*) and browsing and rubbing by roe deer (*Capreolus capreolus*). For a forest owner to gain compensation, a special procedure is prescribed in the game laws. If no amicable agreement between shooting tenant and forest owner can be reached, a forest expert has to evaluate the economic damage. Therefore, in Germany, several methods of economic assessment of damage to forests caused by wildlife have been developed. Two methods in use are presented and discussed.

**Key words:** compensation, damage, forests, Germany, regulations, wildlife

The effects of forest damage by wildlife are numerous. Effects of particular importance are reduction of increment of growth, quality, value, diversity, stability, reduction of protective and recreational functions and last, but not least, a threat to sustainability.

## STATUTORY BASIS FOR COMPENSATION OF WILDLIFE DAMAGE

Legal regulations concerning wildlife in Germany differ substantially from regulations in the United States. The “Bürgerliches Gesetzbuch” (BGB) – Civil Code, the “Bundesjagdgesetz” (BJagdG) – Federal Game Law and the “Landesjagdgesetze” – game laws for each state in Germany, provide, in certain cases, a right to compensation for wildlife damage to forests for forest owners. Smaller landowners, who own less than about 80 hectares (ca. 200 acres) in 1 piece of land, must become members of a “Jagdgenossenschaft” (shooting cooperative) by law. The “Jagdgenossenschaft” rents the shooting right to hunters and receives a shooting lease, which is normally divided among the landowners.

The decision as to who gets the right to hunt on the area of a certain “Jagdgenossenschaft” is made by majority vote. As a kind of compensation for the loss of authority to decide who gets the right to hunt for the single, smaller landowner, legislation provides the right for compensation for wildlife damage in certain cases.

Compared to the U.S. system this may be surprising if not alarming. But, to reduce concern, it should be pointed out that liability exists only for damage caused by hooved game animals, rabbits, and pheasants according to §§ 29–32 Bundesjagdgesetz (Federal Game Law), the statutory framework for wildlife damage compensation. It should also be stressed that not all damage to trees has to be compensated. If, for example, a

forest owner increases the risk of browsing damage by planting beech (*Fagus sylvatica*) into a Norway spruce (*Picea abies*) forest, he also has to build a fence to protect the beech, otherwise no right of compensation for browse damage to beech exists. Alternatively, following this example, if Norway spruce (*Picea abies*) are browsed in high numbers, a right to compensation for damaged Norway spruce exists. In other words, only damage to regular species (Hauptholzarten) of a certain area has to be compensated.

Important species and types of damage in Germany are listed (Table 1). In regard to forest damage, the roe deer (*Capreolus capreolus*) is the most significant wildlife species in Germany because it is found in nearly all forests. In agricultural lands, the wild boar (*Sus scrofa*) is the most significant cause of animal damage. Red deer (*Cervus elaphus*) are restricted to certain areas in Germany, especially mountainous regions, where they sometimes causes severe damage by browsing and debarking. Hares often browse planted broadleaves, but they are excluded from liability for damage, as is the damage by mice and beavers. Beavers are being increasingly reintroduced to German riparian ecosystems. Because these introductions are strongly supported by environmentalists, private funds have been established to compensate for damage. However, a legal claim for compensation of beaver damage does not exist.

Most damage to trees is caused by browsing. As only damage by hooved game, rabbits and pheasants causes liability for damage, it is necessary to know which species browsed a tree. The type of injury to the stem is used to identify the animal that caused the damage. Typical damage caused by roe deer (*Capreolus capreolus*) is a fibrous browsing, where as hares make an unruffled cut (Fig. 1).

**Table 1: Wildlife damage to forests in Germany – important species and types of damage.**

Species	Browsing	Debarking	Rubbing	Marking	Tracks	Gnawing	Compensation possible
Red deer ( <i>Cervus elaphus</i> )	yes	yes	yes	yes	yes	no	yes
Roe deer ( <i>Capreolus capreolus</i> )	yes	no	yes	yes	no	no	yes
Hare ( <i>Lepus europaeus</i> )	yes	yes	no	no	no	yes	no
Rabbit ( <i>Oryctolagus cuniculus</i> )	yes	yes	no	no	no	yes	yes
Chamois ( <i>Rupicapra rupicapra</i> )	yes	no	no	yes	no	no	yes
Mouflon ( <i>Ovis musimon</i> )	yes	yes	no	no	no	no	yes
Fallow deer ( <i>Dama dama</i> )	yes	yes	yes	yes	yes	no	yes
Sika ( <i>Cervus nippon</i> )	yes	yes	yes	yes	no	no	yes
Beaver ( <i>Castor fiber</i> )	no	yes	no	no	no	yes	no
Mouse, Voles ( <i>Muridae</i> , <i>Arvicolidae</i> )	yes	yes	no	no	no	yes	no

## HOW TO ASSERT A CLAIM FOR COMPENSATION

The determination of who is responsible for paying compensation is stated in German federal and state game laws. By law the “Jagdgenossenschaft” is obliged to pay for damage, but most of the shooting lease contracts require that the shooting tenant assumes this liability.

To assert a claim, a prescribed procedure must be carried out. Owners of damaged forests have to assert their claims before May 1 of each year for damage that occurred during autumn and winter, or before October 1 of each year for damage that occurred during spring and summer. Claims are restricted to the past half-year. After these dates the right for compensation expires.

For example, a forest owner discovers, during his Sunday stroll in April, many browsed Norway spruce trees. Norway spruce is a regular tree species in this area and it is obvious that the browsing was done by roe deer. To get compensation, the forest owner first has to claim his damage at the municipal administration. Then the administrator of this program tries to bring about a settlement between the shooting tenant and the forest owner. If there is no agreement, all parties involved have to meet in the damaged area. A forest expert (appraiser), who is appointed by the hunting authorities, takes part and tries again to bring about an agreement. If no agreement is possible, the expert is charged with delivering an expert opinion to the municipal

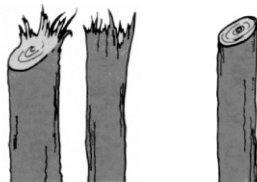
administration. Such an expert opinion has to include exact data about the damaged forest land, tree stocking, the wildlife species causing damage, the extent of damage, any contributing actions of the landowner and the amount of compensation to be paid. With the help of the expert opinion the administration assesses the damage. If the parties involved agree, compensation is paid to the forest owner. In case of disagreement, legal action can be taken to the courts. The costs for an expert opinion are often much higher than the damages.

There are no legal regulations concerning the assessment method the appraiser has to use. In practice, different methods for assessing damage by browsing and debarking are common. Kroth et al. (1985) and Pollanschuetz (1995) published methods to assess browsing damage. The so-called Rosenheimer Model is a series of standards that must apply for compensation of wildlife damage. These standards are included in shooting contracts. To assess debarking damage, 2 methods are used (Kroth et al. 1984, Kato 1981).

The basic premise behind all damage calculation methods (except the Rosenheimer Model) is a calculation of the amount of damage which will be present when the damaged stand is harvested as compared to a non-damaged stand. Between the time browsing or debarking occurs and wood utilization, a period of several decades may pass. Thus, present value has to be calculated by discounting.

## ASSESSMENT OF DAMAGE BY BROWSING USING THE KROTH ESTIMATES

In Germany the most utilized method to assess damage by browsing is that outlined by Kroth et al. (1985) as modified by Bartelheimer and Kollert (1990). Because browsing results in loss of growth increment, this method estimates that if the leader of a plant is browsed the diameter increment of a half to 1 year of



**Fig. 1: Examples of browsing damage as a function of species. On the left is an example of fibrous browsing caused by roe deer, while on the right is an example of unruffled cut browse damage caused by mice, rabbits, and hares (Wotschikowsky 1996).**

the plant is lost. The economic loss then is calculated with the help of a modified net present value method. The stumpage value (value of the stand) is calculated for each age of the plantation, using the internal rate of return. The extent of the damage is the difference between 2 stumpage values, which can be looked up in tables, plus a lump sum for consequential damage. Tables are provided for species – Norway spruce (*Picea abies*), pine (*Pinus sylvestris*), oak (*Quercus robur* and *Quercus petraea*), beech (*Fagus sylvatica*), and for different site classes (yield classes). The internal rates of return used, vary between 0 % for oak in the worst site class and 1.9 % for Norway spruce, in the best site class.

To apply this method the following data have to be collected: percentage of browsed trees, real age of plants and exploitable age of plants (wirtschaftliches Alter), tree species, site class of the stand, degree of stocking, and mixture distribution (for a table assessing lump-sum consequential damage).

For example, 20 % of the plants on 1 hectare of a 6-year-old plantation of Norway spruce may be browsed. The browsing may be severe enough to render the exploitable age of plants equivalent to a 5-year-old stand. Thus,

Stumpage value at the age of 6:	3043 €/ha (Euro per hectare)
Stumpage value at the age of 5:	- 2780 €/ha
Differential amount:	263 €/ha
plus lump sum for consequential damage:	15 €/ha
	278 €/ha
Percentage of browsed trees	20 %
Compensation	278 €/ha x 0.2 = 56 €/ha (52 \$)

The cost for the expert opinion will depend on many different factors, but 250 € could represent a minimum rate for this example.

The acceptance of this method by the hunters association, the shooting (hunting) authorities and forest administration are its main benefits, as well as how easy it is for experts to calculate. The use of different rates of interest for different species and the number of browsed trees as determinants for the amount of compensation provokes criticism by some German assessment specialists. Equally criticized is that compensation increases linearly with the percentage of browsed trees. Critics emphasize that deciding whether browsing causes economic loss for the forest owner does not depend on the number of browsed trees but on the number of unbrowsed trees remaining.

## ASSESSMENT OF BROWSE DAMAGE USING THE ROSENHEIMER MODEL

The so-called Rosenheimer Model is a special shooting contract, containing clauses stipulating compensation for wildlife damage. To get compensation,

the forest owner does not need to settle his claim by legal action. This can help owners avoid many problems and also helps to cut costs. Because the stipulations concerning the assessment of damage are very simple to calculate no expert is needed.

The formulators of the Rosenheimer Model, a cooperative of forest owners who rent shooting rights to hunters, intended to reduce wildlife damage to forests. Therefore, they decided to take low-priced shooting leases, but to claim high compensation if wildlife damage appears. With his or her signature, the shooting tenant accepts this method as a part of the shooting lease. To apply the assessment method described in the Rosenheimer Model only the number, species, and height of browsed trees are needed to calculate the amount of compensation. For example, compensation for Norway spruce trees which are higher than 1m amounts to 0.82 €/plant, if terminal and lateral shoots were browsed.

Again, a criticism of this method is that the number of browsed trees, instead of the number of remaining unbrowsed trees, determines the amount of compensation. A serious problem for forest owners could emerge if 1 of the shooting tenants neglects to pay compensation and the contract is brought to court. As it is probable that the stipulations made in "ROSENHEIMER MODELL" contradict German AGB-law, the judge would probably decide that the stipulations concerning assessment and compensation of wildlife damage within this shooting contract are null and void. The shooting tenant could then keep his contract for the normal duration (9 years) for a low lease fee and the assessment of compensation would be applied, using the common method.

## IS ECONOMIC ASSESSMENT OF WILDLIFE DAMAGE TO FORESTS ALSO USEFUL IN THE USA?

"Bears can cause extensive damage to trees, especially in second-growth forests, by feeding on the inner bark or by clawing off the bark to leave territorial markings" (Hygnstrom 1994). Damage prevention and control methods like fencing, trapping, moving, and killing bears incur costs and can lead to negative reactions by the public. Deer may also browse seedlings or tree plantations, resulting in tree death or misshapen trees. Thus, careful decisions about whether and how to react to wildlife damage and financial consequences of the damage to the forest owner are necessary. Therefore, even if there is no legal obligation to compensate for wildlife damage, it is useful to know methods commonly used to assess financial effects of wildlife damage.

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